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Nameservers for the Address and Routing Parameter Area ("arpa") Domain

Abstract

This document describes revisions to operational practices to separate the function of the "arpa" top-level domain in the DNS from its historical operation alongside the DNS root zone.

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1. Introduction

The "arpa" top-level domain [RFC3172] is designated as an "infrastructure domain" to support techniques defined by Internet standards. Zones under the "arpa" domain provide various mappings, such as IP addresses to domain names and E.164 numbers to URIs. It also contains special-use names such as "home", which is a nonunique name used in residential networks.

Historically, the "arpa" zone has been hosted on almost all of the root nameservers (NSs), and [RFC3172] envisages the "arpa" domain to be "sufficiently critical that the operational requirements for the root servers apply to the operational requirements of the "arpa" servers". To date, this has been implemented by serving the "arpa" domain directly on a subset of the root server infrastructure.

This bundling of root nameserver and "arpa" nameserver operations has entwined management of the zones' contents and their infrastructures. As a result, some proposals under consideration by the IETF involving the "arpa" zone have been discarded due to the risk of conflict with operations associated with managing the content of the root zone or administering the root nameservers.

The separation described in this document resolves the operational impacts of synchronizing edits to the root zone and the "arpa" zone by eliminating the current dependency and allowing more tailored operations based on the unique requirements of each zone.

2. Requirements for the "arpa" Zone

The "arpa" domain continues to play a role in critical Internet operations, and this change does not propose weakening operational requirements described in [RFC3172] for the domain. Future operational requirements for the "arpa" domain are encouraged to follow strong baseline requirements such as those documented in [RFC7720].

Changes to the administration of the "arpa" zone do not alter the management practices of other zones delegated within the "arpa" namespace. For example, "ip6.arpa" would continue to be managed in accordance with [RFC5855].

3. Transition Process

The process will dedicate new hostnames to the servers that are authoritative for the "arpa" zone, but it will initially serve the "arpa" zone from the same hosts.

Once completed, subsequent transitional phases could include using new hosts to replace or augment the existing root nameserver hosts and separating the editing and distribution of the "arpa" zone from necessarily being connected to the root zone. Any future management considerations regarding how such changes may be performed are beyond the scope of this document.

3.1. Dedicated Nameserver Hostnames

Consistent with the use of the "arpa" namespace itself to host nameservers for other delegations in the "arpa" zone [RFC5855], this document specifies a new namespace of "ns.arpa", with the nameserver set for the "arpa" zone to be initially labeled as follows:

```
a.ns.arpa
b.ns.arpa
c.ns.arpa
...
```

Dedicated hostnames eliminate a logical dependency that requires the coordinated editing of the nameservers for the "arpa" zone and the root zone. This component of this transition does not require that the underlying hosts that provide "arpa" name service (that is, the root nameservers) be altered. The "arpa" zone will initially map the new hostnames to the same IP addresses that already provide service under the respective hostnames within "root-servers.net".

Because these nameservers are completely within the "arpa" zone, they will require glue records in the root zone. This is consistent with current practice and requires no operational changes to the root zone.

3.2. Separation of Infrastructure

After initially migrating the "arpa" zone to use hostnames that are not shared with the root zone, the underlying name service is expected to evolve such that it no longer directly aligns with a subset of root nameserver instances. With no shared infrastructure between the root nameservers and the "arpa" nameservers, future novel applications for the "arpa" zone may be possible.

Any subsequent change to the parties providing name service for the zone is considered a normal management responsibility and would be performed in accordance with [RFC3172].

3.3. Zone Administration

Publication of the "arpa" zone file to the authoritative "arpa" nameservers is currently undertaken alongside the root zone maintenance functions. Upon the separation of the "arpa" infrastructure from the root nameserver infrastructure, publication of the "arpa" zone no longer necessarily needs to be technically linked or interrelated to the root zone publication mechanisms.

3.4. Conclusion of Process

Full technical separation of operations of the "arpa" zone and root zone minimally requires the following to be satisfied:

- * The "arpa" zone no longer shares any hostnames in its nameserver set with the root zone.
- * The hosts that provide authoritative name service are not the same hosts as the root nameservers, do not share any IPv4 or IPv6 addresses with the root servers, and are sufficiently provisioned separately such that any unique "arpa" zone requirements can be deployed without affecting how root zone service is provided.
- * The editorial and publication process for the "arpa" zone removes any common dependencies with the root zone process so that the "arpa" zone can be managed, edited, and provisioned wholly independently of the root zone.

Such separation is ultimately sought to allow for novel uses of the "arpa" zone without the risk of inadvertently impacting root zone and root server operations. It is recognized that achieving this state requires a deliberative process involving significant coordination to ensure impacts are minimized.

4. IANA Considerations

IANA shall coordinate the creation of the "ns.arpa" namespace and populate it with address records that reflect the IP addresses of the contemporary root servers documented within "root-servers.net" as its initial state. The namespace may be provisioned either directly

within the "arpa" zone (as an empty nonterminal) or through establishing a dedicated "ns.arpa" zone, according to operational requirements.

IANA will initially migrate the 12 NS records for the "arpa" zone to point to their respective new entries in the "ns.arpa" domain.

When these actions are complete, the IAB and IANA will consult and coordinate with all relevant parties on activity to reduce or eliminate reliance upon the root zone and root server infrastructure serving the "arpa" zone. Such changes will be performed in compliance with [RFC3172] and shall be conducted with all due care and deliberation to mitigate potential impacts on critical infrastructure.

5. Security Considerations

The security of the "arpa" zone is not necessarily impacted by any aspects of these changes. Robust practices associated with administering the content of the zone (including signing the zone with DNSSEC) as well as its distribution will continue to be necessary.

6. References

6.1. Normative References

[RFC3172] Huston, G., Ed., "Management Guidelines & Operational Requirements for the Address and Routing Parameter Area Domain ("arpa")", BCP 52, RFC 3172, DOI 10.17487/RFC3172, September 2001, <<https://www.rfc-editor.org/info/rfc3172>>.

6.2. Informative References

[RFC5855] Abley, J. and T. Manderson, "Nameservers for IPv4 and IPv6 Reverse Zones", BCP 155, RFC 5855, DOI 10.17487/RFC5855, May 2010, <<https://www.rfc-editor.org/info/rfc5855>>.

[RFC7720] Blanchet, M. and L-J. Liman, "DNS Root Name Service Protocol and Deployment Requirements", BCP 40, RFC 7720, DOI 10.17487/RFC7720, December 2015, <<https://www.rfc-editor.org/info/rfc7720>>.

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